



**NATIONAL CENTER FOR  
HEALTH RESEARCH**  
The Voice For Prevention, Treatment And Policy

**National Center for Health Research's Oral Comments on  
Update on the NTP Crumb Rubber Research Program at the  
National Toxicology Program Board of Scientific Counselors Meeting  
on June 29, 2017**

Thank you for the opportunity to speak today. My name is Dr. Stephanie Fox-Rawlings. I am a Senior Fellow at the National Center for Health Research. Our research center analyzes scientific and medical data and provides objective health information to patients, providers, and policymakers. We do not accept funding from industry.

We are concerned that there is insufficient high quality research data to determine the exact risks of recycled crumb rubber for playgrounds and athletic fields. This uncertainty is especially problematic because artificial turf is currently used on more than 12,000 athletic fields and numerous playgrounds in the U.S.<sup>1</sup>

Scientific evidence suggests that crumb rubber may not be safe when used on playground and playing field surfaces. Recycled tire rubber includes phthalates, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), heavy metals, and other chemicals known or suspected to cause adverse health effects.<sup>2,3,4,5</sup> Phthalates can alter hormones. Some PAHs may increase a person's chance of developing cancer.<sup>6,7</sup> While one time or sporadic exposures are unlikely to cause long-term harm, repeated exposures over years, especially during critical developmental periods, raise the likelihood of harm.

These fields can also cause short-term harms. Artificial turf generates dust which may exacerbate asthma for children.<sup>8,9</sup> Fields heat up much more than ambient temperature, which can cause heat stress and burns.<sup>10,11,12</sup>

We are encouraged that federal agencies are taking an interest in this issue in response to numerous consumer and parent complaints over many years. In addition to NTP's research, last year the EPA, CDC and CPSC teamed up to investigate the safety of crumb rubber on playgrounds and playing fields.<sup>8,13,14</sup>

While we support the NTPs research into the health effects of crumb rubber, we strongly encourage the NTP and its stakeholders to uphold the scientific integrity of these studies so that they actually address the gaps in the current literature. The fact is that the research on the health risks of recycled tire rubber has been insufficient and inadequate. We need better scientific data to know the short-term and long-term risks.

Some studies provide evidence that tire crumb surfaces pose safety risks, while others suggest that the risk is minimal. However, the studies that are more reassuring do not comprehensively

evaluate health risks from exposure to recycled tire crumb material. In addition, many studies of air quality use stationary measures, while particulate matter becomes airborne during activity, so these measurements may not accurately reflect exposures during play activities.<sup>15</sup>

NTP's studies should help to fill knowledge gaps. However, this will only occur if the studies are designed to answer these questions. We encourage the NTP to keep the following research design issues in mind:

1. **Research will be most informative if it considers multiple conditions and routes of exposure.** Different types of chemicals can be released under various conditions. For example, rubber can be consumed because it is kicked up into a player's mouth or gets onto a child's hands before they eat. In models of digestion, small amounts of rubber were found to release PAHs and metals.<sup>4,5,16</sup> In addition, the higher temperatures of fields can increase the release of airborne chemicals.<sup>17</sup> There may also be changes in the amount and types of chemicals released as the rubber material degrades, which could greatly alter the health impacts for those playing on the field or playground. Degradation can also create very small particles that can be inhaled as well as coating skin, wounds, clothing, and toys.
2. **Studies in adult animals may not accurately reflect effects during development.** Children and young rats have different exposure rates to environmental chemicals than adults due to differences in size, organ maturity, and behavior.
3. **Short-term studies in rats may be too short, preventing conclusive evidence about identifying effects on their health.** The NTP website suggests that animal studies are only intended to take 2 weeks,<sup>18</sup> which would likely be insufficient to see much evidence of tumor formation, detrimental developmental effects, or other harms.
4. **Differences in risks between male and female rats are well known, and thus research on both sexes should be conducted.**

In addition to issues related to toxicology, fields made of crumb rubber are touted as reducing injuries compared to grass. Research has shown that this is not the case, and some studies have indicated increased risk for joint injuries and mild traumatic brain injury.<sup>19,20</sup> In other words, we can conclude that grass is a relatively safe alternative. We can't say that of artificial turf and crumb rubber.

The safety of playground and playing field materials is an important issue for children, families, athletes, and all individuals engaging in leisure and professional activities on these surfaces. We commend the NTP for providing an open discussion on their study of crumb rubber. This represents a positive effort to help ensure that this widely-used material is safe for children and athletes. Thorough and transparent research with clearly communicated data will advance evidence that will be accepted by the scientific community and used effectively by policy makers and the public. Meanwhile, NTP should be transparent about evidence indicating safety concerns.

Thank you for the opportunity to express our views.

---

<sup>1</sup> Synthetic Turf Council. About synthetic turf. [https://syntheticturfcouncil.site-ym.com/page/About\\_Synthetic\\_Turf](https://syntheticturfcouncil.site-ym.com/page/About_Synthetic_Turf)

<sup>2</sup> Llompарт M, Sanchez-Prado L, Lamas JP, Garcia-Jares C, et al. (2013) Hazardous organic chemicals in rubber recycled tire playgrounds and pavers. *Chemosphere*. 90(2):423-431.

<sup>3</sup> Marsili L, Coppola D, Bianchi N, Maltese S, Bianchi M, Fossi MC. (2014) Release of polycyclic aromatic hydrocarbons and heavy metals from rubber crumb in synthetic turf fields: Preliminary hazard assessment for athletes. *Journal of Environmental and Analytical Toxicology*. 5:(2).

<sup>4</sup> California Office of Environmental Health Hazard Assessment (OEHHA). (2007). Evaluation of health effects of recycled waste wires in playground and track products. Prepared for the California Integrated Waste Management Board. <http://www.calrecycle.ca.gov/publications/Detail.aspx?PublicationID=1206>

<sup>5</sup> Kim S, Yang J-Y, Kim H-H, Yeo I-Y, Shin D-C, and Lim Y-W. (2012). health risk assessment of lead ingestion exposure by particle sizes in crumb rubber on artificial turf considering bioavailability. *Environmental Health and Toxicology*. 27, e2012005. <http://doi.org/10.5620/eht.2012.27.e2012005>

<sup>6</sup> U.S. National Library of Medicine, National Institutes of Health. (2017) Tox Town (Environmental health concerns and toxic chemicals where you live, work, and play): Polycyclic aromatic hydrocarbons (PAHs). [https://toxtown.nlm.nih.gov/text\\_version/chemicals.php?id=80](https://toxtown.nlm.nih.gov/text_version/chemicals.php?id=80)

<sup>7</sup> Armstrong B, Hutchinson E, Unwin J, and Fletcher T. (2004). Lung cancer risk after exposure to polycyclic aromatic hydrocarbons: a review and meta-analysis. *Environmental Health Perspectives*, 112(9), 970.

<sup>8</sup> Shalat SL. (2011). An evaluation of potential exposures to lead and other metals as the result of aerosolized particulate matter from artificial turf playing fields. Submitted to the New Jersey Department of Environmental Protection. <http://www.nj.gov/dep/dsr/publications/artificial-turf-report.pdf>

<sup>9</sup> Mount Sinai Children's Environmental Health Center. (2017) Artificial turf: A health-based consumer guide. <http://icahn.mssm.edu/files/ISMMS/Assets/Departments/Environmental%20Medicine%20and%20Public%20Health/CEHC%20Consumer%20Guide%20to%20Artificial%20Turf%20May%202017.pdf>

<sup>10</sup> Thoms AW, Brosnana JT, Zidekb JM, Sorochana JC. (2014). Models for predicting surface temperatures on synthetic turf playing surfaces. *Procedia Engineering*. 72:895-900. <http://www.sciencedirect.com/science/article/pii/S1877705814006699>

---

<sup>11</sup> Penn State's Center for Sports Surface Research. (2012). Synthetic turf heat evaluation-progress report. <http://plantscience.psu.edu/research/centers/ssrc/documents/heat-progress-report.pdf>

<sup>12</sup> Serensits TJ, McNitt AS, Petrunak DM. (2011). Human health issues on synthetic turf in the USA. Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology, 225(3), 139-146.

<sup>13</sup> U.S. Consumer Product Safety Commission. Crumb rubber information center. <https://www.cpsc.gov/Safety-Education/Safety-Education-Centers/Crumb-Rubber-Safety-Information-Center>

<sup>14</sup> U.S. Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (ATSDR). (2016). Federal research action plan on recycled tire crumb used on playing fields and playgrounds. <https://www.atsdr.cdc.gov/frap/index.html>

<sup>15</sup> U.S. Environmental Protection Agency. (2017). Federal research on recycled tire crumb used on playing fields. <https://www.epa.gov/chemical-research/federal-research-recycled-tire-crumb-used-playing-fields>

<sup>16</sup> Zhang J, Han IK, Zhang L, Crain W. (2008). Hazardous chemicals in synthetic turf materials and their bioaccessibility in digestive fluids. Journal of Exposure Science and Environmental Epidemiology. 18(6):600-7.

<sup>17</sup> Marsili LC (2016). Release of polycyclic aromatic hydrocarbons and heavy metals from rubber crumb in synthetic turf fields: preliminary hazard assessment for athletes. Environmental & Analytical Toxicology. 5:265.

<sup>18</sup> National Toxicology Program. (2017). NTP synthetic turf/recycled tire crumb rubber research: NTP studies. <https://ntp.niehs.nih.gov/results/areas/syntheticurf/studies.html>

<sup>19</sup> Balazs GC, Pavey GJ, Brelin AM, Pickett A, Keblish DJ, Rue JP. (2015) Risk of anterior cruciate ligament injury in athletes on synthetic playing surfaces: A systematic review. American Journal of Sports Medicine. 43(7):1798-804.

<sup>20</sup> Theobald P, Whitelegg L, Nokes LD, Jones MD. (2010). The predicted risk of head injury from fall-related impacts on to third-generation artificial turf and grass soccer surfaces: a comparative biomechanical analysis. Sports Biomechanics. 9(1):29-37.